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March 6, 1954

VOL. 65, NO. 10 PAGES 145-160

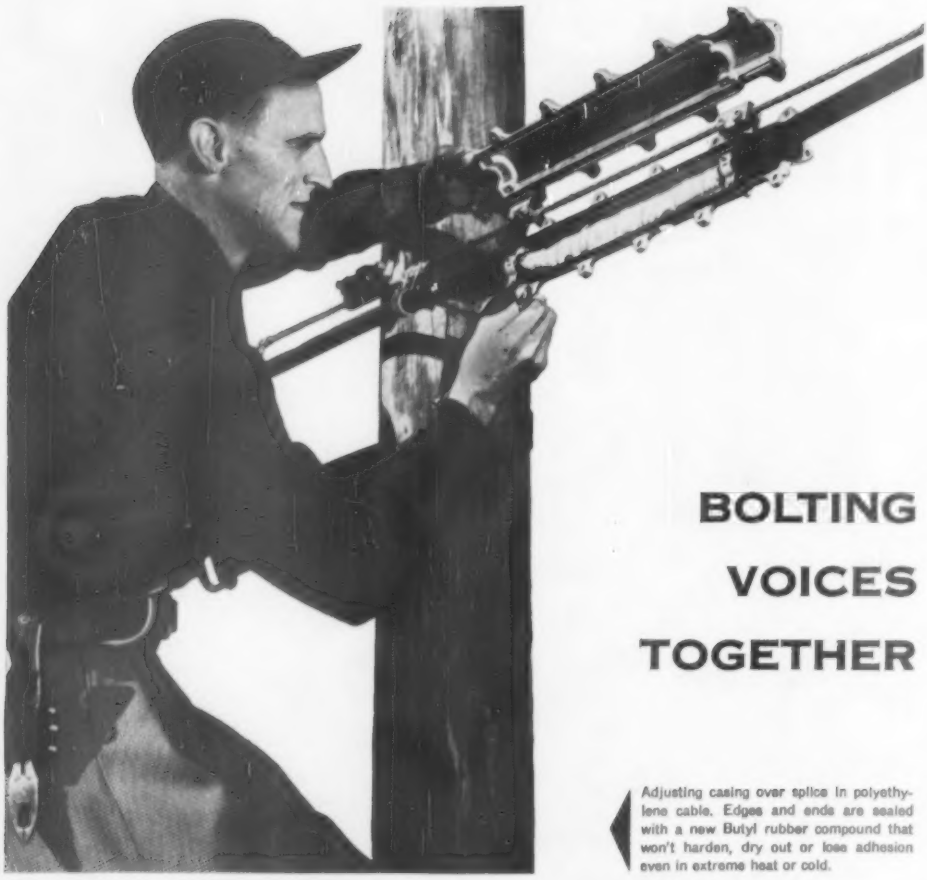
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Science Talent Search Winners

See Page 155

A SCIENCE SERVICE PUBLICATION



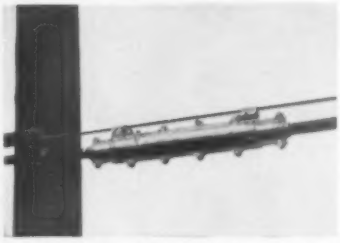
BOLTING VOICES TOGETHER

Adjusting casing over splice in polyethylene cable. Edges and ends are sealed with a new Butyl rubber compound that won't harden, dry out or lose adhesion even in extreme heat or cold.

More than ever, light, flexible polyethylene sheathed cable developed by Bell Telephone Laboratories is providing speedy answers to the demand for more telephone service.

But at thousands of splices, the sheath must be thoroughly sealed against moisture. Laboratories engineers developed a protective casing which is quickly and simply bolted in place. The edges and ends of the casing are *permanently* sealed with a new compound developed by Laboratories rubber chemists.

Now, economical polyethylene cable can be installed much faster and at lower cost. Here is another example of how Bell Laboratories continually finds ways to keep telephone service high in quality, while the cost stays low.



CLOSED CASING IN PLACE

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting, for continued improvements and economies in telephone service.

CHEMICAL PHYSICS

Make Element Number 100

Neutrons, in a two-stage process, are used to produce newest, heaviest element by bombardment of plutonium in an atomic pile. Temporarily known as eka-erbium, its mass is 254.

➤ THE ELEMENTS in the universe now number an even hundred. A few fleeting atoms of chemical element 100 have been produced, starting with the atomic bomb element plutonium, number 94, as the raw material.

The creation of the newest, heaviest element became known when four nuclear chemists of the University of California's Radiation Laboratory talked at a seminar at Berkeley, Calif. They were members of the chemical group led by Dr. Glenn T. Seaborg, Nobelist, who has been in on the synthetic production of all the elements heavier than plutonium. The chemists were Bernard G. Harvey, Stanley G. Thompson, Albert Ghiorso and Gregory R. Choppin.

Neutrons are used in a two stage process to "fatten" plutonium so as to produce element 100. The Atomic Energy Commission's materials testing reactor at Arco, Idaho, was used to supply the neutrons.

Although element 100 is thus built of two essential ingredients of the A-bomb, plutonium which is the fissionable material and neutrons which trigger the bomb, it is itself not useful for making atomic weapons or generating atomic power.

Element 100 has a mass of 254 compared with that of 239 for plutonium. This means that 15 neutrons are added to plutonium to produce it.

Just recently (see SNL, Feb. 13, p. 103), the same laboratory made known the production of element 99 by an entirely different process. Now it is revealed that element 99 can also be made in the reactor by adding neutrons.

Element 100 will be known at least temporarily as eka-erbium, because it is chemically analogous to erbium, element 68, in the rare earth series. Later it may be named by the discoverers.

Element 100 has a half life of about three hours and it decays by shooting off alpha particles, the hearts of helium atoms.

First step in producing element 100 was conversion of plutonium 239 into californium, element 98 with mass of 252. Then neutrons were added further to make the chemical world's new champion heavyweight, mass 254.

The whole story of the discovery of element 100 will not be known until the *Physical Review* dated March 1 is available. Hints are that first preparation of the new element may have been in a cyclotron instead of a reactor.

The scientists phrased it this way: Due to the existence of unpublished information on element 100, the question of its first preparation should not be prejudged on the basis of the present announcement.

Element 100 is the eleventh in the actinide series, and the eighth man-made element. The actinide series, it is believed, will end with the still undiscovered number 103.

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MEDICINE

New Palsy Medicine Now Available in U. S.

➤ DOCTORS GENERALLY will now be able to give their patients with Parkinson's disease, or shaking palsy, a drug which has been limited to clinical trials in this country for the past several years.

The drug is called Parsidol by its manufacturers, Warner-Chilcott Laboratories, New York. Chemically it is N-(2-diethylaminopropyl)-phenothiazine hydrochloride.

It has a sedative, antispasmodic and antihistamine effect. It is said to be especially effective in controlling rigidity, which is one feature of Parkinson's disease. Drs. William H. Timberlake and Robert S. Schwab of Harvard Medical School, Boston, found in their trials of the drug that it was most effective when combined with other drugs. (See SNL, Aug. 16, 1952, p. 105.)

Science News Letter, March 6, 1954

STATISTICS

Predict More Than Eight Million Widows by 1960

➤ BY 1960 the United States may have as many as 8,500,000 widows in its population, statisticians of the Metropolitan Life Insurance Company, New York, predict.

We have almost 7,500,000 widows now and their number is increasing steadily, the statisticians find. In the early years of this century widows were increasing by about 80,000 each year, but since 1930 the yearly rise has been about 100,000.

More than one-half our widows are 65 or older, 1950 Census figures show. Another two-fifths are in the 45 to 64 age group, with only a tenth younger than 45.

A large number of our widows live in cities, 73% in 1950. Nearly three-fifths of all widows maintain their own households, the proportion running as high as 70% among those in the age range 45 to 54, when almost half have children or other relatives living with them.

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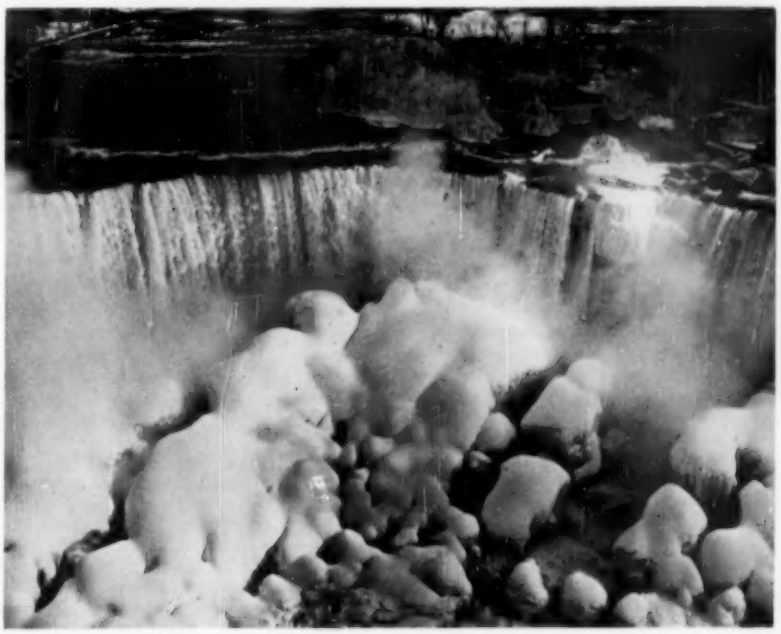

***FAMILIAR SCENE, WINTER-PAINTED**—Although as many as 35,000 visitors have jammed Niagara Falls on a single Sunday to view this year's ice bridge, largest since 1952, a photographer in a Bell Aircraft helicopter captured this view on film. Winter's icy touch turns the famous cataracts and park area into a silvery wonderland.*

MEDICINE

G.G. Failed To Halt Polio

Committee of experts concluded that "beneficial effects were not demonstrated" in use of gamma globulin to prevent cases or to lessen severity of attacks of infantile paralysis.

▶ GAMMA GLOBULIN, or G.G. for short, given last year to hundreds of thousands of children and grown-ups as an anti-polio weapon, failed to show it could halt the disease, either by preventing cases or lessening the severity of the attack.

"Beneficial effects were not demonstrated either in the inoculation of family associates of polio cases or in the mass inoculation of children in epidemic areas," a committee of experts asked by the Public Health Service, Department of Health, Education and Welfare, to evaluate the data collected last summer, concluded.

Some 250,000 youngsters got G.G. shots in the mass inoculations, and tens of thousands of other children and adults were injected with the substance after coming into household contact with diagnosed polio cases. During the year 1953, the National Foundation for Infantile Paralysis spent $5,500,000 in March of Dimes funds to supply 5,000,000 cubic centimeters of G.G. for allocation by the Office of Defense Mobilization. The March of Dimes pledged it would triple this supply in 1954 at a cost of $19,000,000.

Observation of the 23 communities in which mass inoculation with G.G. was done last summer did not give enough information for the Public Health Service's evaluating committee to conclude whether or not gamma globulin had an effect in preventing or alleviating the disease when used in this way.

In most of the cities where gamma globulin was given on a mass basis to all children last summer, the inoculations were given after the peak of the epidemic had been passed. So there was little chance to show an effect of gamma globulin in modifying the epidemic.

To show the efficacy of gamma globulin under conditions of mass inoculations would, in the committee's opinion, require larger experience with greater opportunity for scientific observation.

"The 'family contact' use of gamma globulin, where members of the household of a polio case were inoculated as soon as the illness was recognized, did not measurably reduce the number of subsequent paralytic cases in these households," the committee reported.

"No measurable effect on the severity of the ensuing paralysis" was found in those persons who came down with paralytic polio after getting gamma globulin because they were exposed to the disease through another case in the same household.

The committee was made up of 20 experts, including leading polio researchers and some state and city health officials.

The evaluation program was sponsored by the Public Health Service in collaboration with the Association of State and Territorial Health Officers, the American Physical Therapy Association and the D. T. Watson School of Physiatrics, which is affiliated with the University of Pittsburgh School of Medicine.

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AERONAUTICS

Aircraft Brake Fluid Used to Put Out Fires

▶ AIRCRAFT BRAKE fluid can be used as a fire extinguishing agent by a slight alteration of the chemical content, research by Dr. Bruce R. Mead of the University of California at Los Angeles has suggested.

Halogen compounds, chemicals often contained in brake fluids, are believed to be effective fire extinguishing agents. If applied when the flame has just started, they may break a link in the chain reaction of combustion.

The studies were made for the National Advisory Committee for Aeronautics because of the fire hazard in aircraft accidents. The majority of casualties in such accidents result from fires.

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AGRICULTURE

Bamboo Could Bring South $2,000,000 Yearly

▶ BAMBOO COULD bring southern farmers an estimated $1,300,000 to $2,000,000 yearly if grown in quantity.

A study made by the Georgia Institute of Technology Engineering Experiment Station, Atlanta, shows that there are about 70 uses for bamboo in this country. At present, both finished bamboo articles and raw bamboo are being imported to meet the nation's needs.

The most important use for a native crop would be in paper-making, since large harvests of bamboo could supplement southern pine stands now being used in the manufacture of Kraft papers.

Bamboo also is suited for light, strong construction. It can make ladders, scaffolding and temporary trestlework. It could be used for concrete reinforcement, food, nails, phonograph needles and fuel. A market for bamboo furniture and household ornaments also exists in the United States, the survey revealed.

About 37 species of bamboo now can be obtained from nurseries. These species can be grown successfully in all except the mountainous regions of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, Texas and eastern North Carolina and Virginia.

The Georgia Tech research was sponsored by the U. S. Department of Agriculture and was compiled into a report "A Survey of the Bamboos" by H. H. Sineath, P. M. Daugherty, R. N. Hutton and T. A. Wastler, all of the Engineering Experiment Station.

The report pointed out that there are between 500 and 1,000 species of bamboo in the world. Some of these species attain their mature height of 60 feet in six to eight weeks.

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METALLURGY

New Revolutionary Alloy

Scientists at Naval Ordnance Laboratory develop a non-critical, heat-resistant alloy that has been termed "universal." Great impact upon metallurgical field foreseen.

► SCIENTISTS AT the Naval Ordnance Laboratory have stumbled upon a revolutionary, non-critical, heat-resistant alloy that opens a whole new field to the metallurgist and jet-airplane engineer.

Known as Thermenol, "this universal alloy some day may be as common as iron and may replace some stainless steels in jet engines," Carroll W. Lufcy, head of NOL's magnetics division, told the 40 teen-aged winners of the nationwide Science Talent Search when they visited the laboratory at White Oak, Md.

Thermenol is expected to have a great impact upon the field of metallurgy, because it does not require critically scarce nickel, cobalt or chromium as alloying materials. Instead, small quantities of vanadium or molybdenum, both of which are abundant in the United States, are added to an alloy of iron and aluminum to produce Thermenol.

While running routine tests on 16-Alfenol, a rock-hard magnetic metal which the laboratory learned to roll last year (see SNL, March 7, 1953, p. 150), NOL metallurgists J. F. Nachman and W. F. Buehler noticed its high heat-resistant properties. Working with Mr. Lufcy, the two young scientists probed 16-Alfenol to see what would happen when non-critical materials were used to alloy it.

They produced an alloy which had amazing qualities: it was lightweight; it resisted heat and corrosion; it retained much of its strength at high temperatures, yet it required no high-priced, critically scarce ingredients. The NOL scientists concluded that their new metal was better than some stainless steels.

A sample was rushed to the Lewis Flight Propulsion Laboratory in Cleveland, Ohio, operated by the National Advisory Committee for Aeronautics. Experiments there verified NOL's almost unbelievable findings. The NACA pronounced Thermenol "better than some forms of stainless steel being used widely in the aircraft industry today."

"The metal offers definite possibilities of being a substitute for some of the high-temperature alloys now used in jet engines," Mr. Lufcy said. "We don't know what industry will eventually do with it but it is a natural for such things as airplane, truck and automobile exhaust systems where hot, corrosive gases must be handled.

"It also seems to offer great promise as a heating-element material for coffee makers, electric ranges, toasters and commercial annealing and heat-treating furnaces," he said. "This is because its electrical resistivity is 50% higher than that of the more expensive nickel-chromium alloys now used in these heating elements."

The metal is 20% to 25% lighter than stainless steel. Coupled with its strength and its heat and corrosion resistant properties, this quality makes it a likely candidate for use in jet tail cones and in other areas of the engine which are subjected to scorching temperatures.

It would not only reduce the weight of the jet plane, but would simultaneously release scarce nickel, cobalt and chromium for other uses. These three metals have been in short supply since World War II.

"As far as cost is concerned," Mr. Lufcy said, "the raw materials of Thermenol are less expensive than for stainless steels. However, Thermenol requires a modified manufacturing process. If industry can get set up to mass produce Thermenol, stainless steel just will not be able to compete with it because of Thermenol's low-cost, non-critical components."

The NOL magnetics division is excited over the possibilities created by Thermenol. For the first time, a good alloy has been made with easy-to-get elements. Thermenol opens the door to a whole new field in metallurgy. It is the first of a completely new family of alloys.

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METALLURGY

Hot Leap Moves Germanium to Purity

► MELTED IN moving sections by jumping through a hoop of hot wire, the wonder metal germanium rids itself of impurities as it goes, in a new process just announced.

The improved purification method, useful for the controlled blend of pure germanium with traces of other specific elements essential for transistor construction, was invented by W. G. Pfann of Bell Laboratories.

As an ingot of germanium passes through a hoop of induction heating wire in this process, a narrow band of the germanium melts and its impurities are dissolved in the liquid zone as it moves the length of the metal bar. Only one part in ten billion of anything but germanium remains, while other material becomes concentrated at the end of the bar. This end is then sawed off, leaving the pure germanium ready for final reworking into transistor material.

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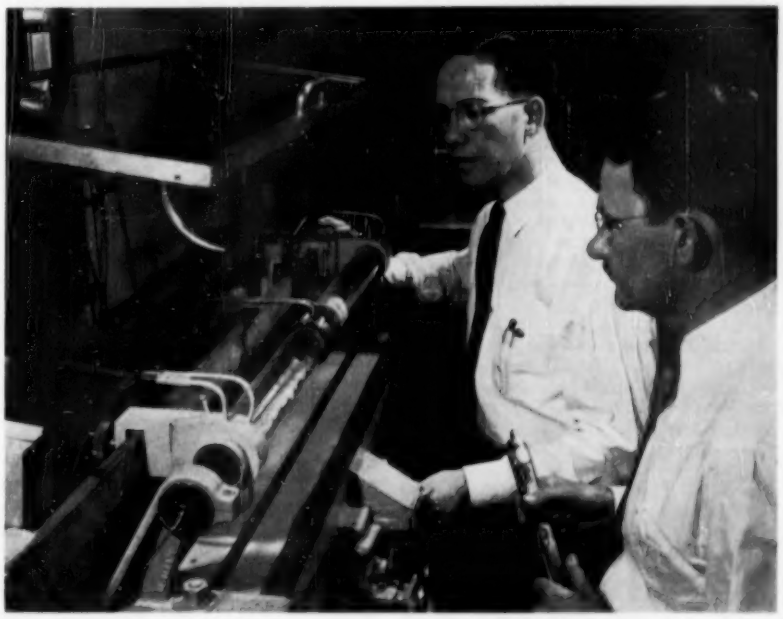

PURITY INSURED—A new and simple refining method developed at Bell Telephone Laboratories melts germanium in moving sections, the ingot passing through a hoop of induction heating wire. In the photograph, W. G. Pfann, left, inventor of the "zone-melting" process, is shown operating the refining equipment, while J. H. Scaff holds a large single crystal of germanium purified by this technique.

MEDICINE

Filters Reduce Tars

Tests show that two filters, the holder that uses another cigarette or the tip made of asbestos laminated with paper, cut down on amount of tars and nicotine from cigarettes.

► IF YOU want to avoid as much as possible of tobacco tars and nicotine while smoking cigarettes, you will either use the kind of holder that holds a cigarette in it as a filter or the kind of cigarette that has a filter tip made of asbestos laminated with paper.

This appears from tests reported in the *Journal of the American Medical Association* (Feb. 20).

They show that, of five holders containing filters, the best is one that uses a cigarette inserted in the holder. With this one, reduction of the nicotine in the mainstream smoke, which reaches the smoker's mouth, is 41%. Reduction of tars in mainstream smoke by this holder is also 41%.

The filter tip of asbestos laminated with paper reduced the nicotine in the mainstream smoke 41% and the tars 44%, earlier tests in the AMA chemical laboratory showed. (See SNL, July 18, 1953, p. 45.)

An earlier model of this filter tip cigarette had done a somewhat better job, 60% nicotine reduction and 55% tar reduction, but was replaced, apparently because it was packed so tightly it interfered with smoking quality. The AMA tests may not have included all filter tip cigarettes now on the market.

Of the five holders reported, three were ineffective, the tests showed. Two of these use for filtering a metal trap like those found in many pipes, and the third uses a cylindrical paper containing a number of small paper baffles.

The fourth holder uses a plastic cylinder filled with granules of silica as a filter. Its performance rated "intermediate" between the ineffective ones and the one with a cigarette in it as filter.

The efficiency of most of the holders dropped after more than the first five cigarettes were smoked through them. When 20 cigarettes were smoked through them, the two with a metal trap lost 27% and 42% of their effectiveness. The one with the paper filter lost 14% of its effectiveness, and the one with a plastic and silica granule filter lost 34%. The one with the cigarette as filter lost none of its effectiveness.

In the tests a "standard" cigarette, that is, the regular size of one of the best-selling cigarettes, was used. With an automatic, constant volume smoking machine, two-thirds of each cigarette was smoked using two-second puffs once a minute.

Whether or not effective filter tips or filter holders will help in prevention of any lung cancer that might be caused by cigarette smoking is not stated in either of the AMA reports on the holders and filter tips. Part of the answer to this depends on whether tars or nicotine or both from cigarettes or some other factor are proved to cause lung cancers in the smokers.

In the report of tests on filter tips in 1953, the AMA stated that "in all cases the fraction of nicotine removed by the filter tip from the smoked portion of the cigarette is small." While there is no such comment in the latest report on the holders, the most effective holder and the most effective filter tip remove the same percentage of nicotine, according to the published figures.

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VETERINARY MEDICINE

Animal Disease Reports Would Aid Defense Effort

► A NATION-WIDE program of livestock disease reporting would strengthen the nation's defense against bacteriological warfare and improve its farm economy, officials for the American Veterinary Medical Association have concluded.

Estimates on animal disease losses now are mere "informed guesses," the officials said. Exact information would be invaluable in public health studies and in spotting outbreaks of foreign livestock diseases that might indicate biological warfare, they stated. Attempts to establish a division of vital statistics in the U. S. Department of Agriculture have been made, but funds have never been made available. The importance of getting such information has long been stressed.

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PALEOBOTANY

Corn Origins Clarified

► CORN, AMERICA'S most important food plant, is definitely a native of this hemisphere with a North American history of at least 60,000 years, four Harvard University botanists have concluded on the basis of new evidence.

The scientists also disputed the widely held theory that corn is a descendant of the Mexican grass, teosinte. This grass had much to do with the evolution of corn through natural hybridization processes, but the "ancestor of corn was corn," Dr. Paul C. Mangelsdorf of Harvard said.

Small cobs of corn discovered in Bat Cave, New Mexico, have been estimated to be 3,000 to 3,900 years old. No larger than strawberries, the cobs have 50 tiny kernels. Dr. Mangelsdorf described the Bat Cave corn as the oldest and most primitive ever found.

"This ancient Bat Cave corn," Dr. Mangelsdorf stated, "proves beyond a reasonable doubt that the ancestor of corn was corn and not, as some 19th century botanists have supposed, the wild grass teosinte."

Teosinte has a corn-like appearance with tassels and ears. The ears are borne separately and usually have five or six seeds enclosed in bony shells.

Dr. Elso Barghoorn of Harvard and Miss Margaret Wolfe of Radcliffe College have definitely established that fossilized grains of pollen taken from earth cores 200 feet beneath Mexico City are corn pollen. (See SNL, May 24, 1952, p. 335.) Dr. Barghoorn estimated the age of the pollen fossils to be at least 60,000 years.

The fossil grains were found in cores studied by Dr. Paul B. Sears of Yale University and Mrs. Kathryn Clisby of Oberlin College. The pollen grains were first thought to be those of teosinte.

Laboratory experiments have shown that crosses of teosinte and corn yield plants with greatly increased variability as well as drought and disease resistance and structural strength. Hybrids of modern corn and teosinte produced synthetic types which match almost exactly the prehistoric cobs, Dr. Mangelsdorf said. Dr. Walton C. Galinat is associated with Dr. Mangelsdorf.

PRIMITIVE CORN COB—Dr. Paul C. Mangelsdorf examines an ancient Bat Cave corn cob.

From the combined vegetal remains in Bat Cave, the scientists have been able to reconstruct the ancient corn plant from which the tiny ears came. It was a short, slender plant, at most two feet high, bearing a few kernels at the base of the tassel and a miniature ear just below the tassel.

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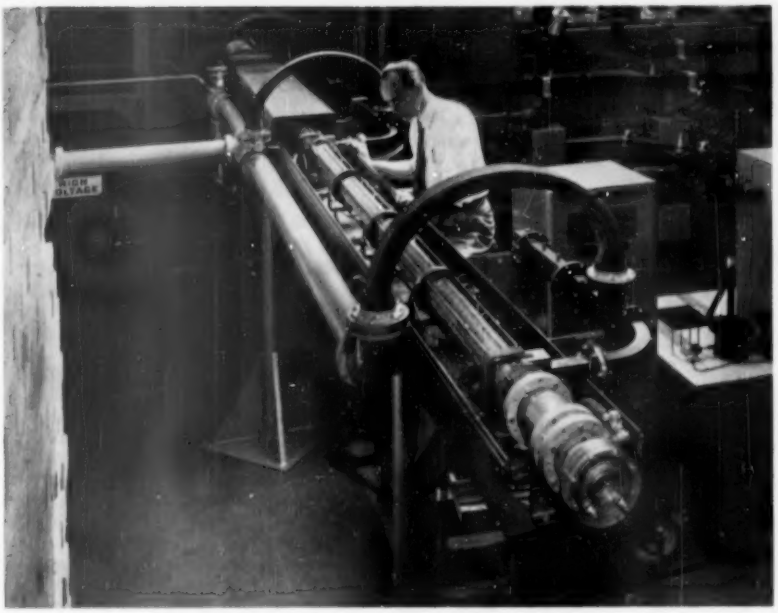

ATOM SMASHER FOR CANCER—Electrons ride radar waves down the 16-foot wave guide of this new, 50,000,000-volt microwave linear accelerator for cancer research. Built by the High Voltage Engineering Corporation, it will be installed at the Argonne Cancer Research Hospital in Chicago.

PUBLIC SAFETY

Civil Defense Worries

Threat of bateriological warfare and of gas attack as well as of A-bombs and H-bombs are among worries of Civil Defense Administration authorities, it is revealed.

▶ WORRY OVER chemical gas and disease germ attack in addition to atomic and hydrogen bomb attacks is evident in civil defense circles.

The need for better means of detecting and identifying the chemicals, such as nerve gases, and disease germs was stressed by two authorities at the joint session of the Council on National Emergency Medical Service and the Fourteenth Annual Congress on Industrial Health meeting in Louisville, Ky.

The speakers were Col. James H. Defandorf of the Federal Civil Defense Administration and Dr. John J. Phair, professor of preventive medicine at the University of Cincinnati College of Medicine.

Advance warning of a gas attack will probably not be possible, Col. Defandorf declared. Procedures for detecting gas attacks while in progress and for identifying the specific chemicals have been devised or are under development. However, these have such a high security classification that they are not now available at State and local civil defense levels. They "probably would become so if the necessity arose," Col. Defandorf said.

Also not yet ready pending further tests is a small, collapsible plastic box to protect infants too small to be fitted with a gas mask.

The capabilities of present tests for germs in air, water or foodstuffs "do not warrant any great hope for their application in the civil defense program in the immediate future," Dr. Phair stated.

"Until detection procedures are available, efforts can be directed only at minimizing rather than preventing casualties," he said. Discussing further our germ warfare defense, he said:

"Even though many glaring deficiencies exist, it should be recognized, but not complacently, that the United States is far better equipped to meet this threat than many other countries."

Some key civil defense workers may this year get an unclassified one week's course, with field exercises, in chemical warfare defense. A request for the Army Chemical Corps to give this has been made, Col. Defandorf reported, and it "appears probable" it will be approved by the Department of Defense.

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BIOCHEMISTRY

Tell Chimpanzee Blood From Human

▶ USING ULTRAVIOLET analysis and the standard blood serum reaction, Dr. A. M. Schechtman and Patricia Knight of the University of California at Los Angeles have found a way to distinguish between the blood and other materials of closely related animals.

The standard serological method involves injecting blood serum from a particular species of animal into rabbits which then make an antibody. The antibody reacts with the serum. Thus, if human serum is injected, the antibody reacts with the human serum, to a lesser degree with monkey serum, and little or not at all with sheep, pig or other serums.

The new technique depends upon the amount of ultraviolet light absorbed by reacting chemicals and can detect the slightest difference in the reactions.

Using this technique, it has been possible to distinguish not only chimpanzee from human blood, but also rat from mouse serum and closely related chemicals present in the lens of the eye in various animals.

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CYTOLOGY

Cold and Infrared Step Up X-Ray Effect

▶ PRE-TREATMENT WITH infrared rays and cold increases several fold the effects of X-rays, Drs. C. P. Swanson, John Strong, Claud S. Rupert and Henry T. Yost have discovered in studies at Johns Hopkins University, Baltimore. Dr. Yost is now at Amherst College.

"There is no prospect of immediate application" of the findings to the treatment of human cancer, states the American Cancer Society in announcing the discovery from the research it aided in part.

Dr. Swanson and colleagues worked with cells in the anthers of the buds of *Tradescantia*, the old fashioned spiderwort used extensively in X-ray studies because of its large chromosomes.

They found that temperatures below 20 degrees Centigrade and a narrow band of sun's infrered spectrum somehow make the cells more vulnerable to X-rays, which change the cell's chromosomes and genes. The changes either kill the cell or alter its hereditary characteristics.

Summer warmth probably prevents the infrared from summer sunlight from doing similar damage to growing plants.

Infrared rays do not penetrate plant or animal tissues very far. In these experiments the effects were registered only through three or four cell layers. Consequently, it is doubtful whether infrared would increase the effectiveness of X-rays to any except the most superficial tissues, unless someone devises a way of getting the light waves into deeper areas.

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MEDICINE

Find New Clues to Virus-Cancer Relation

▶ SOME VIRUSES added to cancer cells growing outside the body will make the cancer cells clump together. Other viruses, added two at a time, will grow in the test tube culture of cancer cells.

These findings, by Drs. Jerome T. Syverton and William F. Scherer of the University of Minnesota, were announced by the American Cancer Society as "new evidence of the relationships of viruses and cancer."

The two viruses that will grow together in a cancer cell culture are pseudorabies, a paralytic hydrophobia, and herpes simplex, which causes fever blisters and cold sores.

One of the viruses that make the cancer cells clump together is vaccinia virus, the cow pox virus used to make anti-smallpox vaccine. Mumps and influenza viruses did not clump the cancer cells.

Some animal cancers are known to be caused, at least in part, by viruses. One kind of rabbit skin cancer develops from an earlier infection by viruses that cause warts; but frequently when the cancers appear, no trace of the wart virus can be found.

The University of Minnesota studies suggest, says the American Cancer Society, that the hidden viruses may be vegetating inside cancer cells, or have changed their form and become raw materials for future virus production.

Science News Letter, March 6, 1954

EDUCATION

First Graders Vary Six Years in Reading Ability

▶ THE AVERAGE six-year-old can write his own name legibly, read the name on the box of cereal on the breakfast table, use all forms of sentence structure and all parts of speech. Far from all six-year-olds are average, however, Dr. Emmett Albert Betts, director of the Reading Clinic at Temple University, Philadelphia, has found.

Among school beginners, there is actually a six-year range of reading maturity levels, Dr. Betts reports in *Education* (Jan.). And this range grows even wider as the children grow older.

When a child is 12, he is in the junior high school. Some 12-year-olds can read as well or better than the average high school senior. Some cannot read at all. In this group, the range spreads over at least 12 years.

The teacher who is faced with such a range of instruction problems must organize her class into groups. And she must take into account also individual differences in the various subjects.

She has trouble finding suitable reading materials for all the different levels of students in her class. A 12- or 15-year-old who cannot read very well may have the same interests as his classmate with advanced reading ability. He needs reading matter of primer difficulty, but with high-school interest level. A nine-year-old would have no interest in a basic reader intended for the six-year-old, whether he is accelerated or retarded in reading.

Generally, girls are superior to boys in reading and writing although the situation is reversed with arithmetic, history and science.

On the average, girls begin to talk earlier than boys do and they use short sentences earlier. Boys are more likely than girls to have a speech defect or reading disability.

An average child uses two words at 12 months and short sentences at two years.

Science News Letter, March 6, 1954

MEDICINE

South Reassured on Polio Vaccine Tests

▶ SOUTHERN COMMUNITIES afraid the polio vaccine production delay might count them out on vaccine trials this year because polio starts early in the South have been given some reassurance by the National Foundation for Infantile Paralysis.

Polio vaccine tests will begin in the South in late March or early April, Dr. Hart E. Van Riper, medical director of the Foundation said.

In fact, the first supply of test vaccine will be made available to southern test areas, he stated. This is because the annual outbreak of poliomyelitis in epidemic form "traditionally" starts in the South in the spring, and moves northward during June, July and August.

Whether the vaccine will be effective in protecting against polio is not yet known. The large scale tests this spring and summer are planned to answer that question if possible. But if, as hoped, the vaccine does have protective power, it must be given well before any exposure to polio cases. That is why everyone concerned hopes the test vaccinating in the South can start early.

The decision whether to go ahead or not in any county selected for the test will be made, when the time comes, by the State Health Officer on the basis of the situation as it is then found to be.

"I am sure the Health Officer in any state would cancel the test in a county if the incidence of polio showed an epidemic was already gathering momentum there," Dr. Van Riper stated.

"We are very certain, however, this will not be the case in many of the southern counties selected for the test. The appearance of a few cases of polio without the pattern of steady increase in numbers would not be sufficient reason for abandoning the test."

Polio epidemics before May are rare even in the South, Dr. Van Riper said. He also pointed out that the pattern of outbreaks in the past has differed from state to state.

Children selected for receiving the vaccine will be given three doses over a period of five weeks.

Science News Letter, March 6, 1954

IN SCIEN

BIOPHYSICS

Warns of Danger in Some Atomic Treatments

▶ TREATING PATIENTS with fast neutrons released by atomic energy radiation should be done with "great caution," warns Dr. George H. Mickey of Northwestern University, Evanston, Ill.

He bases his warning on studies showing that, contrary to past belief, these neutrons are much more likely than X-rays to damage hereditary genes in parents and to cause death-dealing biological abnormalities, called mutations, in offspring.

Working at Evanston and at Oak Ridge, Tenn., Dr. Mickey and his research assistant, Armon F. Yanders, compared the effects on fruit flies of X-rays, fast neutrons from a cyclotron and fast neutrons from a nuclear detonation.

The effect of each was tested upon five types of mutation. In each case, the neutron radiations, either from a cyclotron or an atomic blast, were found to be much more effective in producing biological abnormalities.

Two of the mutation types studied are fatal to the mutant. These are recessive sex-linked lethal mutations and dominant lethal mutations. Concerning these, Dr. Mickey said:

"Contrary to reports of previous investigators that fast neutrons are only about two-thirds as effective as X-rays in producing sex-linked recessive lethal mutations, we find the neutrons to be more than twice as effective. Also, dominant lethals are produced at a much higher frequency by fast neutrons than by X-rays."

Science News Letter, March 6, 1954

VETERINARY MEDICINE

Tests Show Florida Bats Can Carry Dread Rabies

▶ RABIES HAS been found in Florida yellow bats and seminole bats, Dr. James E. Scatterday, public health veterinarian of the Florida State Board of Health, Jacksonville, reports in the *Journal of the American Veterinary Medical Association* (Feb.).

In the summer of 1953 a seven-year-old child on a ranch near Tampa was bitten by a yellow bat. Tests showed that the bat was rabid and the child was given antirabies vaccine. Since that time, Dr. Scatterday said, bats have been collected from the ranch and another area. Six of the bats had positive tests for rabies.

The Florida yellow bat and the seminole bat live in trees and other vegetation. They do not form colonies in caves or enclosures as some bats do.

Science News Letter, March 6, 1954

CE FIELDS

GEOPHYSICS

Shortwave Upsets Now Not Always Atmospheric

► EVEN THOUGH shortwave listening conditions are forecast as being good, users have been warned that, at the present time, reception can be upset because of operating difficulties and the limited number of frequencies now available.

"We are now at a very low point of the 11-year solar activity cycle," radio forecasters at the National Bureau of Standards point out. This accounts for the seeming disturbances when the ionosphere is actually quiet.

There are very few usable frequencies available even under normal conditions, with the worst squeeze in the pre-dawn hours. The effect of small changes in ionospheric conditions, or minor variations in the power supply, which are relatively unimportant at sunspot maximum, can be greatly magnified at the present low stage of solar activity.

Science News Letter, March 6, 1954

MEDICINE

Outlook Better for Women in Some Cancers

► WOMEN FARE much better than men in recovering, after treatment, from cancers of the mouth, tongue and pharynx, Dr. Marion H. Russell, statistician of the Christie Hospital and Holt Radium Institute, Manchester, reports in the *British Medical Journal* (Feb. 20).

This finding is based on a study of more than 2,000 patients treated by radium or deep X-rays during the years 1932 to 1942 inclusive.

In terms of survival after operation, long-term survival (10 years), primary recurrence of the cancer and secondary involvment of lymph glands before and after treatment of the primary cancer, the women did better than the men.

Dr. Russell's studies showed such differences as 15% post-operative mortality for men with cancer of the tongue compared to four percent for the women, and 23% survival for 10 years for the men with tongue cancer compared to 42% survival for 10 years for the women.

Women, the study showed, are also less prone to develop metastases, or spread of the cancer, than men.

Possible reasons for the difference might be the effect of female hormones, the comparative incidence of syphilis and the standards of mouth hygiene.

Analysis of the results on a pre- and post-menopausal basis failed to show any real difference, so the female sex hormone influence seems ruled out. It was not possible for Dr. Russell to get accurate information on the presence of syphilis or the state of mouth hygiene in all the patients, although "there is a strong suggestion from various sources that the standard of oral hygiene is appreciably higher in women than in men."

Such local influences, however, may play only a small part, Dr. Russell points out. The differences between the sexes shown in the study may be "merely a cogent example of the fact that the female, although lacking equal physical strength, is nevertheless fundamentally possessed of greater stamina than the male."

Science News Letter, March 6, 1954

MEDICINE

Arthritis From Modern Blood Pressure Remedy

► DEVELOPMENT OF arthritis and other diseases of joints and connective tissue in 17 of 211 patients getting one of the modern blood pressure reducing remedies brings a warning on the need for care in the use of the drug.

The warning appears in a report from Drs. H. Mitchell Perry Jr. and Henry A. Schroeder of Washington University School of Medicine and Barnes Hospital, St. Louis, in the *Journal of the American Medical Association* (Feb. 20).

The drug is hydralazine hydrochloride. The combination of this drug with hexamethonium chloride, called hyphex therapy, when given in adequate doses effectively controls severe and malignant hypertension, or high blood pressure.

This poses quite a problem for doctors. The arthritis and other symptoms, even when severe, clear up soon after the hydralazine treatment is stopped, but then the blood pressure goes up. Substituting extracts of the Indian plant, *Rauwolfia serpentina*, has "invariably" resulted in a return of the high blood pressure even when given with considerably larger or almost doubled doses of hexamethonium, Drs. Perry and Schroeder found.

In one case when treatment was stopped because of the reaction to the drug, the patient died of a ruptured aneurysm of the aorta that had not been evident when the blood pressure was controlled by the hydralazine.

A substitute for hydralazine with a similar action is greatly needed, the doctors point out.

Meanwhile, because the arthritis and other reactions are reversible and do not develop in all patients and because the hazard of severe and malignant high blood pressure is real, doctors may have to take the "calculated risk" of continuing to use hydralazine in some patients whose high blood pressure endangers their health.

The treatment, the doctors warn, should not be used "indiscriminately" without adequate follow-up and an awareness of the nature of late toxic reactions.

Science News Letter, March 6, 1954

PSYCHOLOGY

Distances in Space Affect Your Judgment of Time

► EINSTEIN'S IDEA of the close relationship between time and space receives support from experiments in psychology reported in *Nature* (Feb. 20). They show your perception of time is affected by space.

If you watch two lights flashing one after the other and try to hold down a telegraph key for a time equal to the interval between the two flashes, your estimate of the time is affected by the space between the lights. The shorter the distance in space between them, the shorter will be your estimate of the time interval. This discovery was made by psychologist Dr. D. R. Price-Williams of Birkbeck College, University of London.

In nearly every case, the estimate of the time was shorter than the actual interval, he found. When the same light was flashed twice, a seven-second interval was judged to be only six and a half seconds. When a 32-inch space separated the two lights, the judgment was 6.64 seconds. An 11-second interval with the single light was judged to be 8.96 seconds, with the two lights, 9.51.

In a second experiment, two different lights were flashed each time, but the distance between them was sometimes eight inches, sometimes 16 inches and sometimes 32 inches.

The seven-second interval between light flashes spaced eight inches apart was judged to be 5.93 seconds, spaced 32 inches apart it was judged to be 7.07 seconds. The 11-second interval was judged as 8.39 seconds at eight inches and 9.49 seconds at 32 inches.

Even when the lights are both directly in line with the observer instead of at right angles to him, a similar effect is noted. With a single light flashed, a seven-second interval was judged at 6.49 seconds. With two lights, one 32 inches behind the other, it was judged at 7.09 seconds. An 11-second interval with one light and with two lights is judged as 9.04 and 9.71 seconds, respectively.

Science News Letter, March 6, 1954

ENTOMOLOGY

Insecticides Control Peach and Cherry Pest

► NEW INSECTICIDES applied to foliage and soil are controlling the serious peach, cherry and apple pest, the plum curculio.

Tests made by O. I. Snapp at the U. S. Department of Agriculture entomology station, Fort Valley, Ga., have shown that dieldrin and parathion sprays provide better control of the insect than existing methods.

Early season spraying with dieldrin, an insecticide in the DDT family, followed by parathion sprays are being used. This treatment is still in the experimental stages.

Full season spraying with dieldrin would probably leave excessive spray residues on the fruit. When applied to the soil, dieldrin kills the larvae of the curculio.

Science News Letter, March 6, 1954

BIOLOGY

Animals Old Hands At Angling

Fishing is not a human monopoly. Lower animals have been accomplished masters of Izaak Walton's art for millions of years. Rods, lures, nets, lines and trawls are used.

By CLARE M. COTTON

➤ FISHING IS not a human monopoly. Though it may shock the expensively equipped sport fishermen, lower animals have been accomplished anglers for millions of years.

During this evolutionary period, some of them have developed fascinating tricks for catching their fish, while others have added or modified parts to their bodies to make angling a little more "scientific." These tricks and anatomical variations anticipate the best human fishing techniques.

Ask a young boy what he fishes with and he will probably say worms, but there is one kind of worm that fishes for itself.

Nemertean worms live in the sea on both coasts of the United States and are what might be called living fishing lines. Species of *Nemertea* range in length from less than an inch to 90 feet.

At rest they contract into a lump that resembles beef liver. But let an unwary fish come by. The sucking mouth hooks the fish and the "line" begins to run out. The worm "plays" the fish until it is exhausted, then enjoys a meal at rest.

Reliable accounts of jaguars in South America report that this large cat has learned to use its tail as a lure. Thumping the water with the tail or gently waving it in the water arouses the curiosity of the fish and lures it to its doom. A quick jab of the paw, and the jaguar has a tasty meal.

All known species of wild cats that live within a reasonable distance of water have developed the arts of Izaak Walton.

One, the Indian fishing cat, has been named for its great ability to sweep fish ashore. Bengal tigers have also been known to live on fish when floods force them to stay in trees for an extended period of time.

Domestic Cats Included

The ordinary house cat has not been left behind in this angling development. There are many authentic cases of cats finding their desire for a meal of fish has overcome their intense dislike of the water.

Getting closer to man in the evolutionary scale, monkeys have raised the art of "tickling" to a high point. Ancient Egyptian paintings have led some to propound the theory that baboons were once trained as tickling professionals, turning their catch over to humans of course.

Insects and spiders are commonly thought of as bait, either live or simulated for fly-casting, but some of these fish for themselves. Wolf spiders make a raft-net out of their web and punt over sluggish water trapping small fish on the surface. The giant water bug in Mexico is said to "hound" down fish, and there are reports of other spiders using their webs as nets to catch fish.

Most fishing birds have long, sharp bills which act as harpoons and a long neck back of the bill serves in the place of rope. The heron is a good example of this.

It stands still for hours for an unwary fish to mistake its legs for reeds, then it spears the victim. Herons have been known to spear bigger fish than they can handle and choke or strangle to death.

Cormorants have been trained as professional fishermen for man by the Japanese. A ring around the bird's neck prevents its swallowing the catch and the cormorant takes the catch back to its master to receive a reward. Darters, similar to the cormorants, carry the harpoon method one step further.

The neck of this bird is constructed on the trigger principle so that in one sense the darter "shoots" its quarry. Instances have been reported in which a darter's bill has driven more than a half inch into a board.

The pelican combines harpoon, rope and landing net. Some of these birds can hold up to 40 pounds of fish in their throat pouches.

Perhaps the most famous of the fishing animals, however, is Reynard, the fox. Stories of the fox using his tail as a piece of angling equipment can be found in almost every country through long periods of time. Nearly 2,000 years ago Claudius Aelianus, a Roman, described a fox fishing with his tail and the "Uncle Remus" story by Joel Chandler Harris on the subject is familiar to millions of Americans.

The difficulty is that while it is known that the fox loves fish, no observer whom scientists accredit has ever seen a fox fishing with his tail. Most in the past have tended to discount the numerous stories as examples of folklore.

Believed Folklore Example

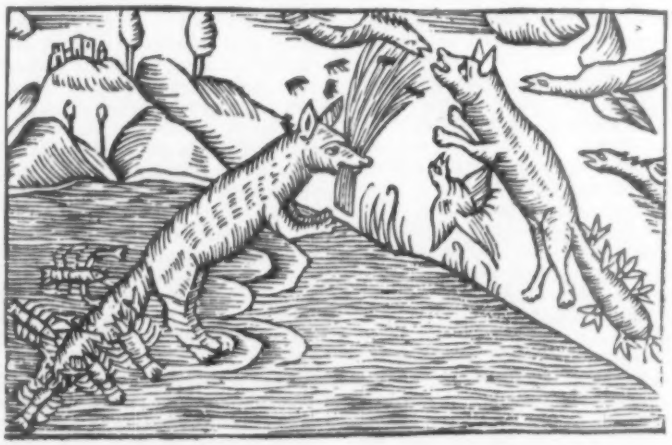
Dr. E. W. Gudger of the American Museum of Natural History, New York, has advised his colleagues to have a more open mind on this subject.

He points out that crayfish, the favorite item in the fox's seafood menu, might easily be caught in such an object as a fox tail.

Other mammals like bears, seals, otters, mink and martens are known to catch and eat fish, but their methods are usually more direct—either by scooping out with the paw or, in the case of the swimming mammals, using the tactics of fish themselves.

Any person with a photograph of a fox or any other animal fishing with his tail could settle this argument very quickly, but at the present time there are only drawings and these are not reliable.

Fish, of course, fish for a living. Most of them use the principle of the commercial fishing trawl—opening their mouths and



FOXY FISH TALE—A fox in Sweden comes ashore with a catch of crayfishes attached to his tail in this woodcut made in 1555 by Olaus Magnus. Most zoologists doubt that wily Reynard fishes with his tail, but some feel the question is still open for discussion.

sweeping through the water catching the small fish unfortunate enough to be in their path.

Some fish, more lazy than others, have developed tactics to make life easier for themselves. Angler fish simply rest on the bottom and do their fishing with a rod and bait.

The first dorsal fin ray in this fish is on the snout and is long and limber. At its tip a fleshy flap grows which is waved gently in the water as a bait to lure fish. Sooner or later some passing fish bites, the rod bends, the mouth opens, and the angler deposits another fish in its gullet to be eaten later at his leisure.

Cuttlefish Used by Man

Cuttlefish have long sucker-tipped arms that may be stretched out to catch fish. In certain parts of the South Seas, such sucking fish are attached to lines by men and used to catch fish, providing another example of man's using an animal's highly developed angling technique for his own purposes.

Among the swimming mammals, the walrus has developed a method of plowing for its food. Though extremely strong, the walrus is very clumsy and awkward, and cannot fish very well while swimming. Most of its food is gotten by plowing up the sea bottom with its tusks, eating the vegetation, shellfish and mud-loving fish that are on the bottom.

The molars of a walrus are very heavy and can crush the largest oyster shell with ease. The tusks so useful as plows also serve as boat-hooks. When a walrus wants to get out on the ice, it simply hooks on with the tusks and scrambles up on the ice.

Fishing is definitely not a human monopoly and most of man's favorite devices for catching his dinner were developed by some lower animal during its evolution.

Science News Letter, March 6, 1954

Cotton is picked at the rate of one and a half acres an hour with a new tractor-drawn, low cost harvester using nylon brushes.

The strange actions of *sound waves* in shallow water can be compared to the breaking up of light into many colors when it is reflected from a thin film of oil.

ELECTRONICS

Electronic Blood Analyzer

Inexpensive instrument developed that may be used for quick examination of mass blood samples for possible atomic radiation damage.

See Front Cover

▶ A MACHINE has been created at the National Bureau of Standards that may lead to a device that could be highly useful in identifying victims of atomic radiation in the event of an H-bomb attack.

H. M. Joseph of the Bureau's electronic instrumentation laboratory stated that future variations of his laboratory model might be made to examine blood specimens for symptoms of atomic radiation and report its findings quickly.

A fast analysis of mass blood samples presumably could help doctors find and treat persons who could respond to anti-radiation measures.

The device was previewed by the 40 teen-aged scientists in Washington for the five-day Science Talent Institute, sponsored by SCIENCE SERVICE and the Westinghouse Educational Foundation.

They are shown on the cover of this week's SCIENCE NEWS LETTER with Dr. Allen V. Astin, director of the National Bureau of Standards, at the start of their tour of the Bureau's facilities.

In its present form, the machine can "look" at a blurred photograph or a fuzzy X-ray film and produce a sharper image on a television-like picture tube.

The relatively inexpensive instrument consists of a lens system placed between a cathode-ray tube, similar to a television picture tube, and a photomultiplier tube. A picture transparency is slipped into the lens system. The cathode ray tube scans the transparency while the photomultiplier tube intently "watches," amplifies what it "sees" and feeds corrections back to the scanning tube.

Picture signals are tapped off the photomultiplier tube and are fed through a modifying amplifier to a repeater picture tube. Then a person can adjust the controls to make the picture appear in sharper focus, or as a line drawing.

The machine also could be adapted to serve the criminologist, it is believed. Fingerprints, often distorted when the criminal applies pressure to safes or automobile doors, could be "straightened out" again when corrections are automatically fed into the device. The result should be a fingerprint that matches the proper one.

Army aerial photograph experts may be able to use another adaptation of the instrument as a camouflage spotter. Aerial photos are compared periodically to reveal changes in the area under scrutiny. This is a tedious, time-consuming process involving skilled specialists.

The pictures must be carefully examined since the photographs of a given sector may be taken from different angles. A future version of the machine could compensate for these different camera angles, showing up camouflage as glaring changes.

Since the machine can recognize shapes, it also seems possible that a modified version could lead a guided missile to the precise airplane or railroad switchyard which it was dispatched to destroy.

The idea for the instrument came from Dr. L. S. G. Kovasznay of Johns Hopkins University, who also acted as a consultant on the project. The work was performed as part of a basic instrumentation program of the National Bureau of Standards. It was sponsored by the Office of Naval Research, the Atomic Energy Commission and the Air Research and Development Command of the U. S. Air Force.

Science News Letter, March 6, 1954

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Where Do You Want to Go?
FRANCE? WEST INDIES? BRAZIL? HAWAII? MEXICO?

Read what The Christian Science Monitor says about a new way to travel that sometimes costs 1/3 to 1/2 less.

BY THE travel editor of The Christian Science Monitor: Many fascinating travel booklets pass over this desk in the course of a year but the one that arrived the other day so interested this department that it cost the office several hours of work in order that we might absorb its content. The booklet is entitled "Travel Routes Around the World" and is the traveler's directory to passenger-carrying freighters and liners. In no time at all you find yourself far out to sea cruising along under tropical skies without a care in the world. You find yourself docking at strange ports and taking land tours to those places you long have read about. Most interesting of the vast listings of ships are the freighters which carry a limited number of passengers in quarters comparable to the luxury offered in the so-called big cruise ships which devote most of their space for passengers.

The booklet first of all answers the question: What is a freighter? The modern freighter, says the booklet, ranks with the de-luxe passenger vessels so far as comfort and accommodations are concerned.

LARGE ROOMS WITH BEDS

It is important to realize that in most cases today, freighter passengers are considered first-class passengers, although the rates charged are generally on a par with either cabin or tourist-class fare. Most passenger-carrying freighters, to quote the booklet, have their private bath and shower, and these cabins offer beds, not bunks. The rooms are generally larger than equivalent accommodations aboard passenger ships, and the cabin of a modern freighter is sometimes even twice as large as first-class cabins on some of the older passenger ships. It goes without saying that your room is on the outside, and amidships, the most expensive of all locations, for which you are usually charged a premium over the advertised minimum fares on passenger ships.

This booklet points out that it is frequently astonishing how low freighter fares are as compared with passenger ship fares: for example, less than one-half of the passenger ship fare to California is the amount asked on freighters. On most of the longer runs, the difference in favor of the freighters is regularly from a third to half of the passenger ship fare.

SERVICE AND MEALS RATED EXCELLENT

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Foreign ships offer their own specialties, says the booklet. Thus vessels in the East Indian trade serve Rijkstafel (or King's Table), the East Indian dish which can run to as many as 50 different courses. Scandinavian ships serve Smorgasbord every day, and some of their desserts (like strawberries smothered in a huge bowl of whipped cream) are never forgotten. Another feature of freighter travel is in its informality. No formal clothes are needed. Sports clothes are enough.

Other valuable information such as how to tip, shipboard activities and costs are covered in the booklet. "Travel Routes Around the World." Some of the trips listed include a trip to England for $160, a 12-day Caribbean cruise for $240, or a leisurely three-month Mediterranean voyage.

The booklet is published by Harian Publications, Greenlawn, New York, and may be obtained by sending to the publisher. So, when it arrives all you need to do is sit down and take your choice. The booklet lists literally hundreds of ocean trips.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE ALLERGIC CHILD—Harry Swartz—*Coward-McCann*, 297 p., $3.95. In the United States some five million children under 14 suffer from some one or more allergies. A physician provides information on the subject in a book written for parents.

AMARYLLIS: and How To grow Them — Peggie Schulz—*Barrows*, 128 p., illus., $2.95. A book for enthusiasts for this showy and satisfying flower.

CHILDREN FOR THE CHILDLESS: A Concise Explanation of the Medical, Scientific, and Legal Facts About Conception, Fertility, Sterility, Heredity and Adoption—Morris Fishbein, Ed.—*Doubleday*, 223 p., illus., $2.95. How to have children of your own or to adopt them. Contributed by nine specialists.

CONTRIBUTIONS TO AMERICAN ANTHROPOLOGY AND HISTORY: Volume XI, Numbers 52-56—Howel Williams and others—*Carnegie Institution of Washington*, 236 p., illus., paper $6.75, cloth $7.50. These contributions include studies of some ancient human footprints found in the long-ago solidified mudflow from a volcano, a burial mound in Guatemala and ball courts where prehistoric athletes competed.

EACH ONE TEACH ONE: Frank Laubach, Friend to Millions—Marjorie Medary—*Longmans, Green*, 227 p., $3.00. Concerning the life and work of an enthusiast for bringing literacy to the world's millions who cannot read or write.

FLOWER SHOW GUIDE: Complete Directions for Exhibiting, Staging, Judging—Anne Wertsner Wood—*Barrows*, 207 p., $3.00. An authoritative book for flower lovers and amateur and professional gardeners.

FRESH WATER FROM THE OCEAN: For Cities, Industry, and Irrigation—Cecil B. Ellis and members of the staff of Nuclear Development Associates—*Ronald Press*, 217 p., illus., $5.00. Investigating the possibilities of extracting fresh water from the ocean on a large scale and at low cost. Undertaken under the sponsorship of the Conservation Foundation.

THE GARDENER'S ABC OF PEST AND DISEASE—A. W. Dimock—*Barrows*, 191 p., illus., $2.95. A practical book for the home gardener.

HERE COME THE BEARS!—Alice E. Goudey—*Scribner's*, 93 p., illus., $2.25. An animal story for children.

THE HOUR OF INSIGHT: A Sequel to Moments of Personal Discovery—R. M. MacIver, Ed.—*Institute for Religious and Social Studies (Harper)*, Religion and Civilization Series, 145 p., $2.00. Anthropologist Dorothy D. Lee, biochemist Hudson Hoagland and neurologist Harold G. Wolff are among the authors who here tell of a flash of insight that provided a turning point for their lives.

INTERLINGUA A PRIME VISTA — Alexander Gode—*Storm*, 79 p., illus., $2.00. Interlingua is a new, or rather derived language for international use, easy to read at sight because it is made up of elements commonly occurring in the western languages. Here it is presented with pictures in a way that makes it easy to master.

MAN IN SOCIETY: Preface to Sociology and the Social Sciences—George Simpson—*Doubleday*, Doubleday Short Studies in Sociology, 90 p., paper, 95 cents. The first of a series of some twenty studies intended as an introduction to sociology for students just beginning its study.

NOT ONLY FOR DUCKS: The Story of Rain—Glenn O. Blough—*McGraw-Hill*, 48 p., illus., $2.25. A book for children telling them how important rain is for all living things in both city and country.

PRINCIPLES OF NUMERICAL ANALYSIS—Alston S. Householder—*McGraw-Hill*, 274 p., $6.00. A textbook for graduate students and mathematicians on the principles of computation useful in planning routines for high-speed digital computers.

REPORT OF COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS 1953—C. M. Ferguson, director, Extension Service—*Govt. Printing Office*, 53 p., illus., paper, 20 cents. Each extension agent now offers help to 1,100 farmers, and 1,600 farm families look to each home demonstration agent.

SAIPAN: The Ethnology of a War-Devastated Island — Alexander Spoehr — *Chicago Natural History Museum*, Fieldiana: Anthropology, Volume 41, 383 p., illus., paper, $5.00. Results of field research among the Chamorros and Carolinians of Saipan, "handsome tropical island" in the Marianas.

THERAPEUTIC ABORTION: Medical, Psychiatric, Legal, Anthropological and Religious Considerations—Harold Rosen, Ed.—*Julian Press*, 348 p., $7.50. Twenty specialists discuss the many aspects of this controversial problem.

WATER SUPPLY AND POLLUTION CONTROL—Richard D. Hoak—*Mellon Institute*, 12 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

Science News Letter, March 6, 1954

ELECTRONICS

Machine Unscrambles Flight Data on Missiles

► AN ELECTRONIC machine with a taste for music has been devised that, in two days, can whiz through guided missile flight data radioed back to earth during tests, unscramble the facts and figures and make order out of chaos.

Before the unscrambler was perfected, this job took weeks, Lockheed Aircraft Corporation research engineers in Burbank, Calif., report. Now the task is completed faster and with less chance of error.

During the flight test, transmitters squeezed into the missile broadcast messages fed to them by scores of delicate test instruments. Each instrument's reading is radioed to the ground as a sound closely resembling a violin note. Variations in pitch mean changes in instrument readings.

As many as 30,000 a minute of these readings are decoded by the musical-eared machine. From a master recording tape, it transposes high A's into speed readings and F-sharps into heat, stress, steering information, engine performance or whatever the F-sharp represents.

These readings come out on punched cards for electronic computation. The cards are fed into an automatic plotting machine.

The machine then produces a graph, charting the data as curves. Engineers study the graphs to learn what they can about the missile's performance.

Science News Letter, March 6, 1954

U. S. industry now has one *engineer* for every 60 employees compared to a ratio of one to 250 in 1900.

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ENTOMOLOGY

NATURE RAMBLINGS

Spiders

► ONE SIGN of authentic Navajo weaving, it is said, is a hole left in the middle of the blanket or basket. This is in compliance with an ancient compact with the Spider Woman, who imposed this condition in return for teaching the Pueblo Indians of the Southwest the arts of spinning.

The ancient Greeks paid tribute to spiders with a legend of their own. A maiden named Arachne was so skillful at the domestic art that she challenged the goddess of weaving, Athena, to a competition. Her handiwork was so excellent that the goddess, in a rage, destroyed the tapestry of her mortal rival, changed Arachne into a spider, and condemned her to an eternity of spinning.

Arachne became the Greek word for spider, and scientists still preserve the word in their name, the Arachnida, for the class of creatures to which spiders belong along with scorpions, mites, ticks and Daddy Longlegs.

People frequently make the mistake—usually accompanied with an "ugh" of revulsion—of grouping spiders with insects. Spiders are not insects. Insects form a separate class of their own. The spider clan differs in many ways, possibly the most striking being the fact that they have eight legs.

Another interesting difference between spiders and insects is that spiders lack wings. But this lack of "conventional" flying equipment is no serious handicap, because spiders have evolved a method of airborne travel that is as giddy as a roller coaster and as improbable as a magic carpet. It is called ballooning.

Ballooning is an activity which seems to be characteristic of new-born spiders, but it is by no means restricted to them. Provided the spider species is small in size, all age and maturity groups seem to indulge in the sport. The way the game is played is this: A spider will make for the highest available point, for example the pinnacle of a stalk of grass. Then it will face into the wind, pointing its abdomen at a high angle up into the air.

This position, with the rear end tilted up like a cannon, puts the spinnerets into an advantageous position. Silk thread starts from the spinnerets, the passing breeze tugs on the silk, pulling it out. As the thread grows longer, the tug grows stronger, and at a certain point the spider lets go its toehold and goes sailing off down-wind on its silken filament.

This unlikely aeronautical technique probably accounts for the dispersion of spiders all over the globe. Charles Darwin observed ballooning spiders when his ship, the Beagle, was 60 miles off the South American coast, and they have been reported as far as 200 miles offshore.

One of the requirements for ballooning is lightness of weight. The larger spiders, like the tarantula, are too bulky for ballooning even when young.

Science News Letter, March 6, 1954

MATH IS FUN

By Joseph Degrazia, Ph.D.

Here is a treasury of brain-teasers. You need not be a mathematical genius to solve these problems and puzzles. What you need is to know how to THINK LOGICALLY—how to REASON. This is practically a "course" in applied logic and reasoning—besides being an immense amount of fun that will keep you absorbed for many hours. You will find not only that MATH IS FUN, but also that learning math can be fun!

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"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Walter Lowdermilk, consultant in soil conservation and land utilization, Food and Agriculture Organization of the United Nations, will discuss "Land of the World."

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Questions

EDUCATION—How much variation has been found in the reading ability of six-year-old children? p. 152.

□ □ □

GEOPHYSICS—Where are we in the 11-year solar activity cycle? p. 153.

□ □ □

MEDICINE—How has the effect of anti-polio gamma globulin shots been rated by experts? p. 148.

□ □ □

METALLURGY—What non-critical metals are used in a revolutionary new alloy? p. 149.

□ □ □

PALEOBOTANY—What is now believed to be the ancestor of corn? p. 150.

□ □ □

PSYCHOLOGY—How do distances in space affect your judgment of time? p. 153.

□ □ □

Photographs: Cover, Fremont Davis; p. 147, Bell Aircraft Corporation; p. 149, Bell Telephone Laboratories; p. 150, Harvard University; p. 151, High Voltage Engineering Corporation; p. 160, Eaton-Dikeman Co.

ZOOLOGY

Mice Live, Breed in Below Freezing Cold

► THE HOUSE mouse can live and breed in cold storage rooms at below freezing temperatures.

Two families of white mice reached the third generation in a room kept at two to four degrees below zero Centigrade, about 26 degrees Fahrenheit, Drs. S. A. Barnett and Brenda M. Manly of the University of Glasgow report in *Nature* (Feb. 20).

The mice in cold storage were compared with control families kept at 50 degrees and 68 degrees Fahrenheit. The control families reached the fourth generation in the time the cold mice reached the third generation.

Nests were made from cotton wool, and the nest temperatures in the cold rooms were about the same temperature as the nests of the control mice. Scientists reported that the mice in the cold rooms had nests of better construction than the controls.

Functional changes involved in the adaptation to below freezing temperatures are being studied.

Science News Letter, March 6, 1954

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What General Electric people are saying . . .

T. M. LINVILLE

Mr. Linville is Manager, Research Operation Services Department, General Electric Research Laboratory

". . . It may well be that the supply of professional managers may determine the fate of our civilization. Adequate supply coupled with further development of the science of managing is needed, because the fulfillment of human wants demands organized human effort on an ever-increasing scale.

People today, as always, are seeking more comforts and less drudgery as well as protection from the hazards of life. Today the outstanding hazards are war, unemployment, illness, old age, and dependency of loved ones. The comforts being sought are the age old ones of food, shelter, and clothing, and the newer ones of education, recreation, and personal freedom and development.

If professional managers fail to meet these objectives, some short-sighted politicians are likely to lead the people to give up their economic and political freedoms, thereby freezing the economy into low-level production.

Professional managing is a calling in which one puts special knowledge to use with broad human understanding in the services of not only himself and his employers, but also in the service of his employees, his customers, and the community and nation.

This is a very different way of managing from the pre-Civil War slavery in the South and autocratic empire building in the industrial North. It has come about in this twentieth century. It is a professional kind of job.

The feudal concept that first dominated the industrial world has been replaced by business organizations which operate in the interest of, and by the consent of, owners, employees, customers, and the public. The managers are professional employees. The ownership is diffused. Such organizations put to work the people's savings. They provide the best means to gain the benefits sought by the people at large.

at The University of Illinois

E. S. LEE

Mr. Lee is Editor of the General Electric Review

". . . The prophecy made years ago by Dr. Steinmetz that the electrical age—and the electrical industry—was in its infancy, can still be made today. In 1935 the electrical manufacturing industry supplied only 1.7 percent of the gross national product. Today it supplies 4 percent. There are those who forecast that as early as 1961 the products of electrical manufacturing will represent an estimated 5½ to 6 percent of the gross national product.

The forecasters have been busy, too, drawing dotted lines to show the probable kilowatt-hour output of electric power in the years ahead. A once daring prediction of one-trillion kilowatt-hours for the year 1970 is now moved ahead to 1965, and the really long-range prophets are talking among themselves about an annual output of five-trillion kilowatt-hours by the year 2000.

By virtue of its position, the electrical industry must be prepared to grow more than twice as fast as the remainder of the economy. Based on the best estimates of the growth of the economy as a whole, it is probable that in the next 10 years as much electrical generating equipment will be built, sold, and installed as has been built and installed in the industry's past 75-year history.

What a prospect for the engineer! Such growth means the solution of new and more complex technical problems, together with the advancement of managing ability to solve the many human problems that come with the expanded units of production. In both of these realms the call for solutions is intense. In ever-expanding avenues the opportunity for the new is more extensive than ever.

G.E. Review

J. K. WOLFE

Dr. Wolfe is a Research Associate at the General Electric Research Laboratory

". . . Recently, a new class of fluorine compounds, namely 'fluorocarbons' have appeared which show promise of considerable commercial as well as scientific interest.

These fluorocarbons whether gas, liquid or solid, show extraordinary stability toward heat and oxidation from air of chemicals. The solids and liquids are not swelled or attacked by gasoline, solvents, acids, or other chemical materials. High thermal stability is a well-known characteristic of the inert fluorocarbons. On heating they decompose only at high temperatures in the range of 1000 degrees F. to mixtures of saturated and unsaturated compounds. They are not attacked by the usual chemicals, acids, bases, or oxidizing agents, even at high temperatures. In the electrical field, fluorocarbon liquids have many properties which can afford a basis for new equipment design. A combination of properties which these materials possess is certainly not found in any other class of fluids. Besides being nonflammable and usually stable, they possess exceptional electrical properties being particularly resistant to the flow of electrical current over a wide range of frequencies.

Some of the more recent developments of fluorocarbon derivatives are just beginning to open more fields. The initial high prices of these materials will undoubtedly be decreased as the volume and use becomes more extensive. The price will undoubtedly follow the established pattern as production increases and there are many other places where you will see fluorocarbons occupying a very important spot in the future.

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SPEEDY GLUE bonds porous materials and can be used to repair porcelain articles or, when applied in a thin coat, to put a preserving film on maps or pictures. The colorless glue will permanently bond the following materials in any combination: wood, hardboard, cloth, leather and paper.

Science News Letter, March 6, 1954

ANTI-CURL MAGNETIC tape has been specially designed to "last a lifetime" under usual operating conditions. The recording tape also is said to be unbreakable in normal use. It will not shrink, stretch or dry out even under the most abnormal climatic conditions.

Science News Letter, March 6, 1954

EYEGLASS LOUPE attaches to either metal or plastic spectacle frames to give toolmakers, inspectors, watchmakers and hobbyists a magnified view of tiny screws and fine detail. The single lens model can be obtained to magnify 3X to 7X. A double lens model provides alternative powers of 4X or 7X.

Science News Letter, March 6, 1954

COFFEE-SAVING FILTER papers, shown in the photograph, can be placed in dripolators and percolators to give a zestful, non-rancid brew. Less coffee is required per cup because the filter paper keeps the hot water in contact with the grounds longer. The paper also is said to absorb rancid oils during the brewing.

Science News Letter, March 6, 1954

SLIDING CLOSET doors are made of steel which has been designed to resemble the natural grain finish of birch. The finish is protected by a coat of clear lacquer. Easily installed, the doors use four nylon plastic rollers and four guide rollers designed to give noise-free performance and to prevent sway and derailing.

Science News Letter, March 6, 1954

ANTI-JAMMING ZIPPER has a push-button control which frees any fabric caught in the teeth or the slider during operation. The all-metal zipper has been made in sizes small enough for women's dresses.

Science News Letter, March 6, 1954

PORTABLE RECORDER fits into a briefcase, weighs only nine pounds and can record up to four hours of speech without interruption on one belt-like record. Businessmen can dictate letters to the battery-powered device while flying or driving, and the records can be mailed, indexed and filed.

Science News Letter, March 6, 1954

CRUISING SCALE, useful in measuring tree diameters, volumes, heights and growth rings, is a spring steel tape wound in a small metal case. The six-foot-long tape also can be used in log scaling, in getting pulpwood estimates, and in scientific forestry studies.

Science News Letter, March 6, 1954

An extra fillip for every week . . .

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3-6-54

Do You Know?

One out of every 16 persons in the United States suffered a disabling *injury* in 1953.

Meal made from menhaden, one of the least known but most important species of commercial *fish*, is used for poultry and swine feeding.

Each person in the United States uses, directly or indirectly, more than 2,000 kilowatt hours of *electricity* a year, compared with two kilowatt hours per person in Pakistan.

A blood serum concentrate has been developed for the treatment and prevention of rare but serious complications of *smallpox* vaccination.

The drug, benadryl hydrochloride, controls *nausea* after operations.

The number of *people* of age 65 and over has increased by nearly 50% since 1940, making the total about 13,500,000 now.